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Wince

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(54) **LUG TERMINALS BLOCK FOR QUICK CONNECTION AND DISCONNECTION**

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H01R 13/62	(2006.01)
H01R 9/24	(2006.01)
H01R 43/26	(2006.01)

(52) **U.S. Cl.**
CPC ***H01R 13/6205*** (2013.01); ***H01R 9/2416*** (2013.01); ***H01R 43/26*** (2013.01)

(58) **Field of Classification Search**
CPC H01R 11/30; H01R 13/6205
USPC 439/38–40, 305, 129
See application file for complete search history.

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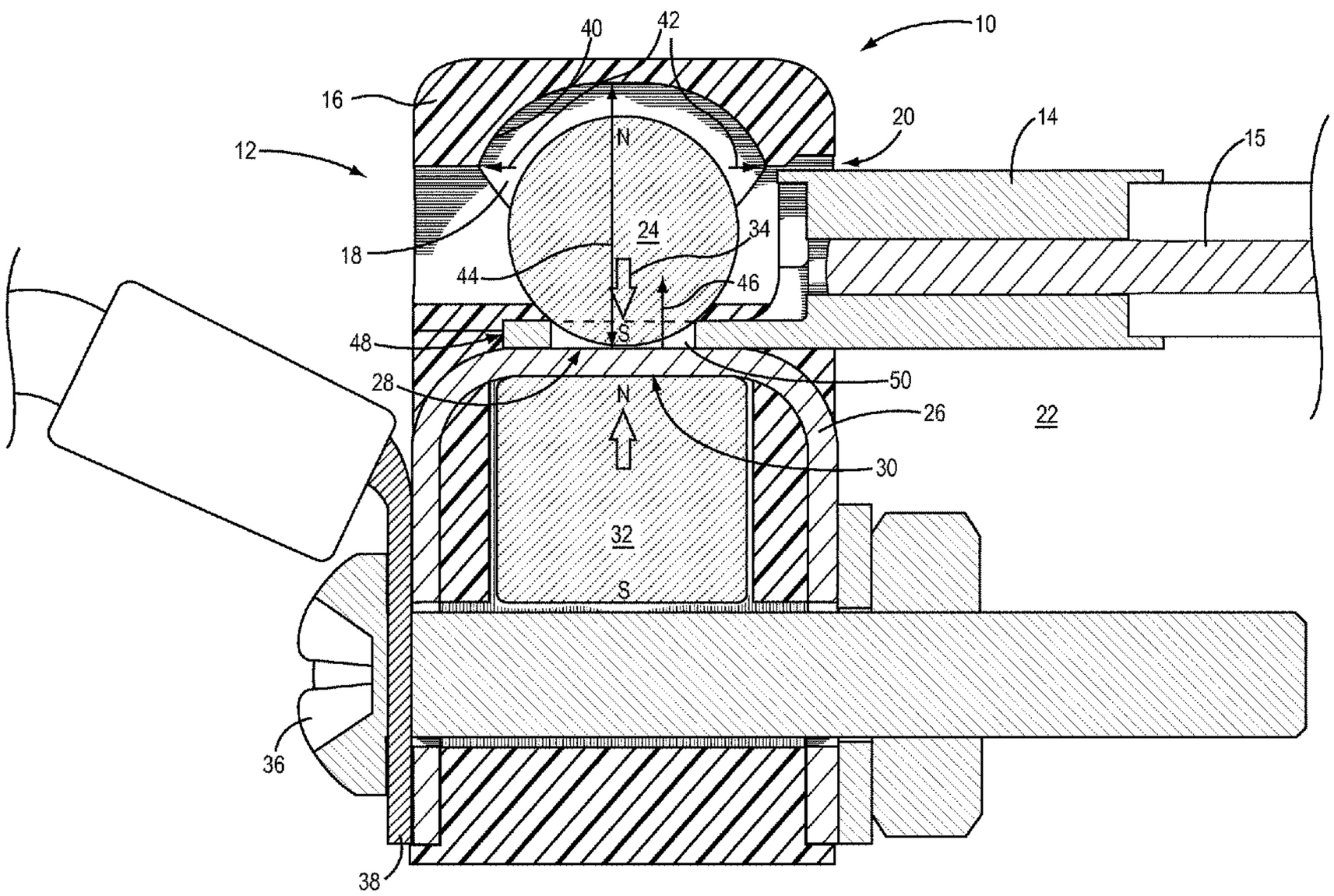
(57) **ABSTRACT**

A terminal block is disclosed. The terminal block includes a body that forms a chamber and an opening configured to facilitate passage of a lug terminal from an exterior environment into the chamber. A movable first ferromagnetic object is positioned in the chamber. An electrical contact is exposed to the chamber, and a second ferromagnetic object is configured to magnetically attract the movable first ferromagnetic object in a direction toward the electrical contact.

17 Claims, 12 Drawing Sheets



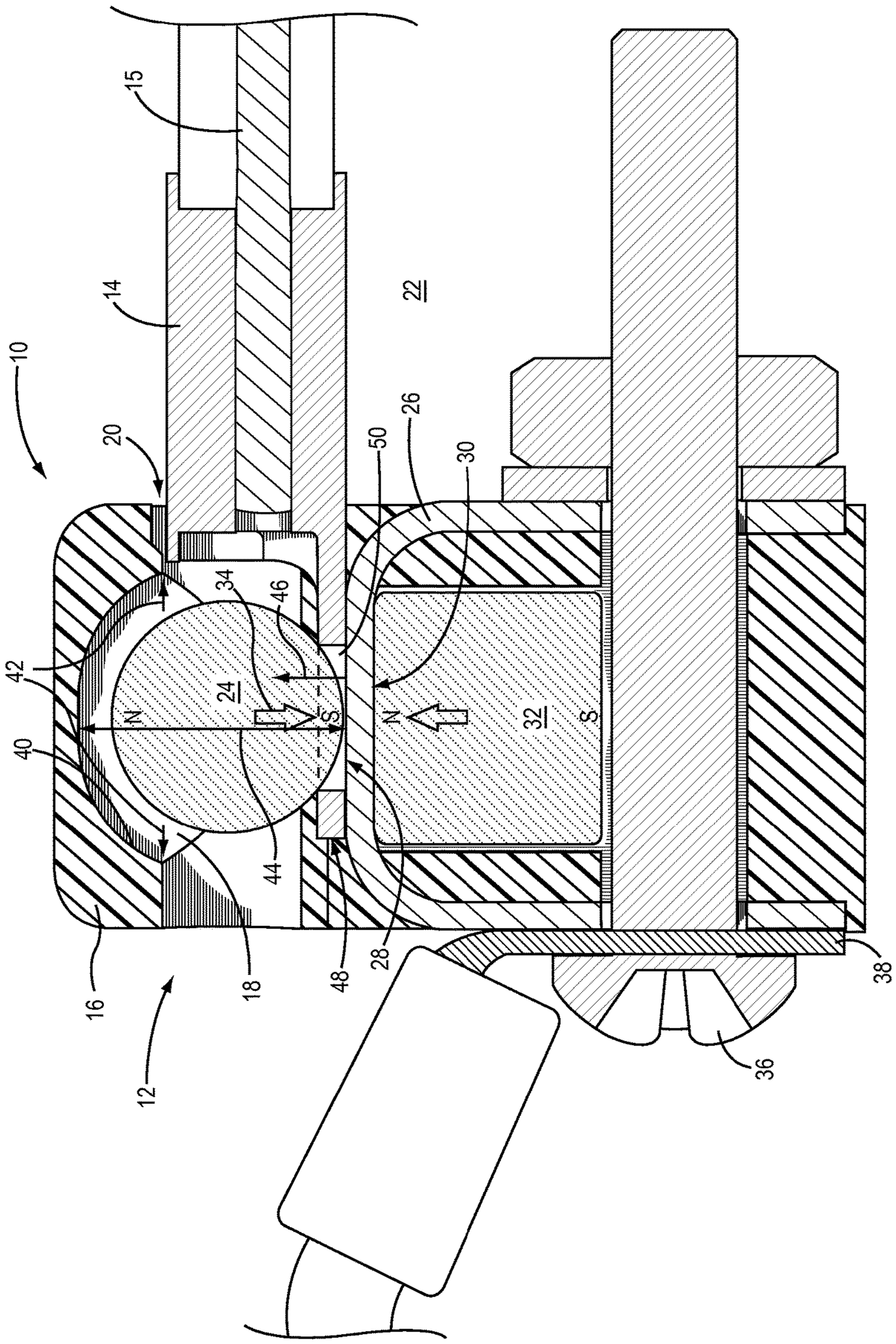


FIG. 1

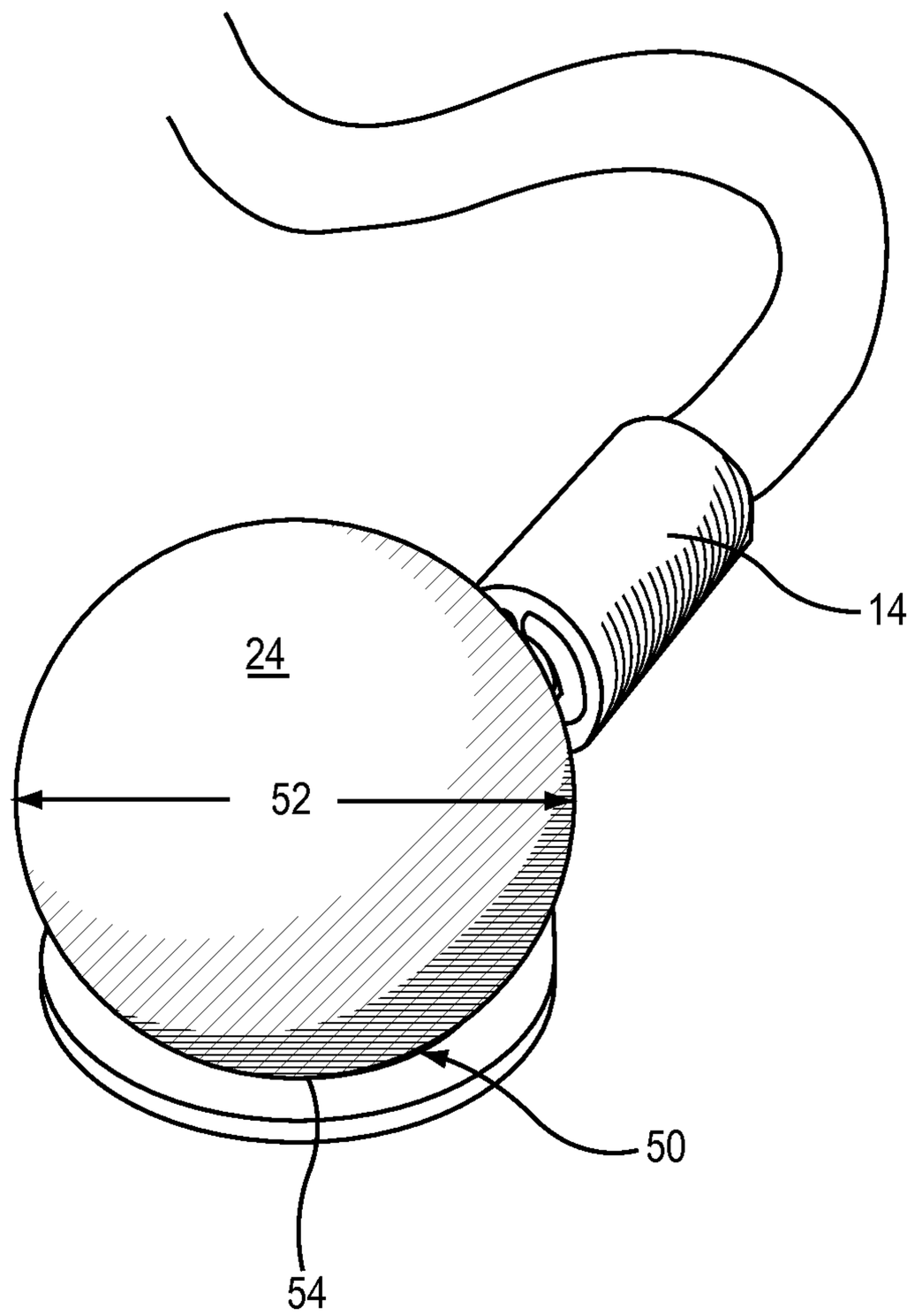
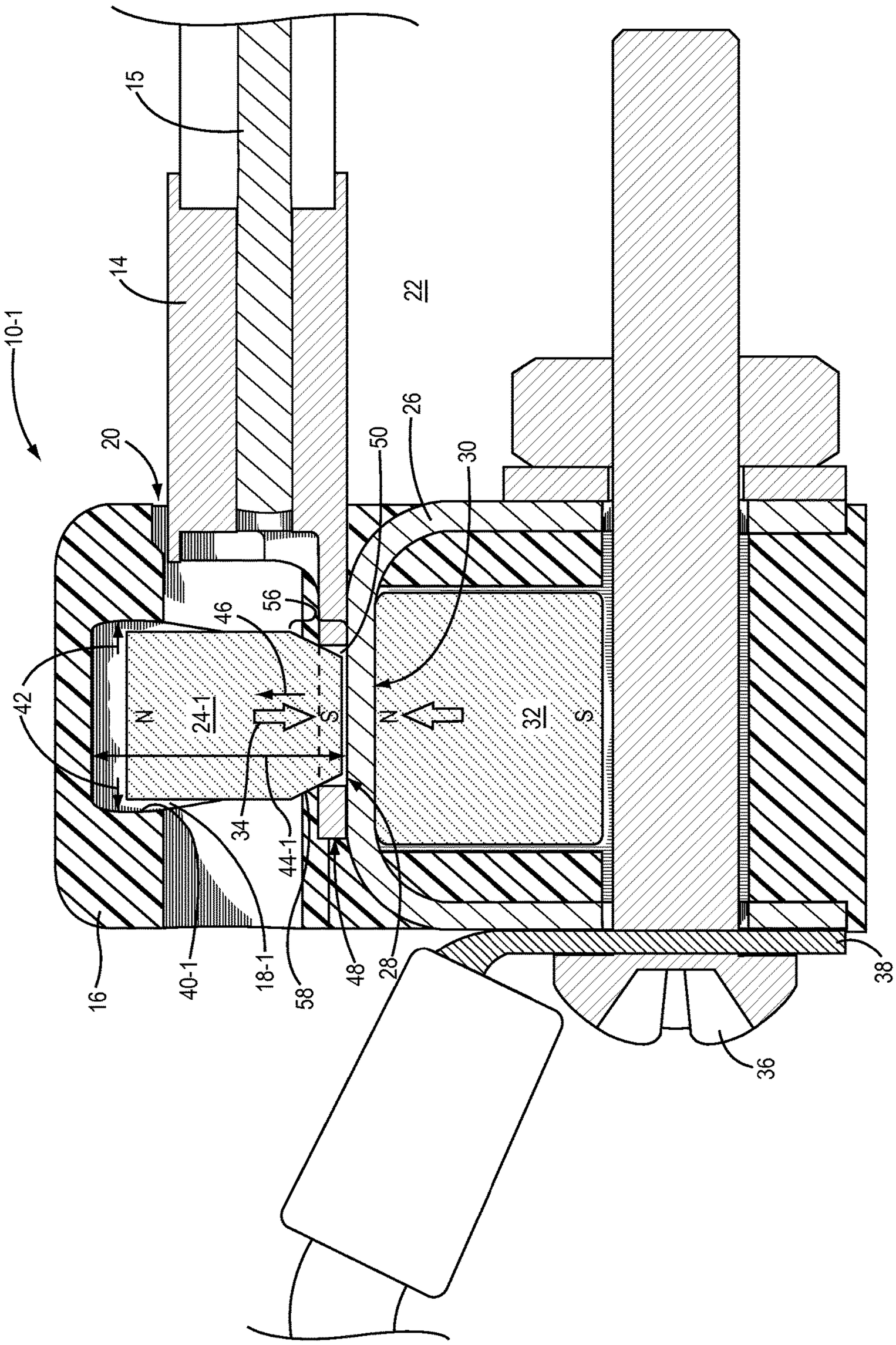


FIG. 2


10-1
15
14
22
20
26
50
30
42
46
56
N
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N
32
S
34
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16
40-1
18-1
58
48
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38
36

FIG. 3

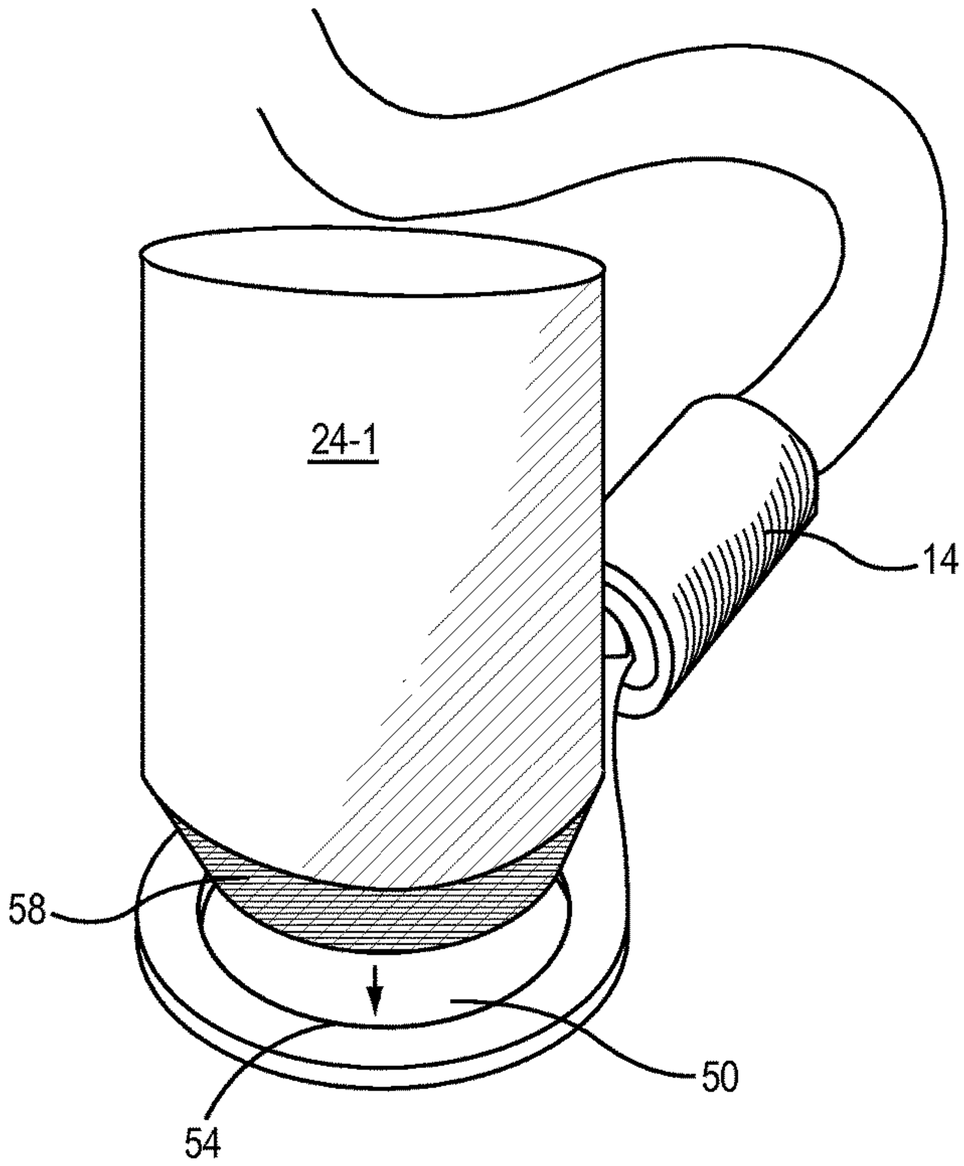


FIG. 4

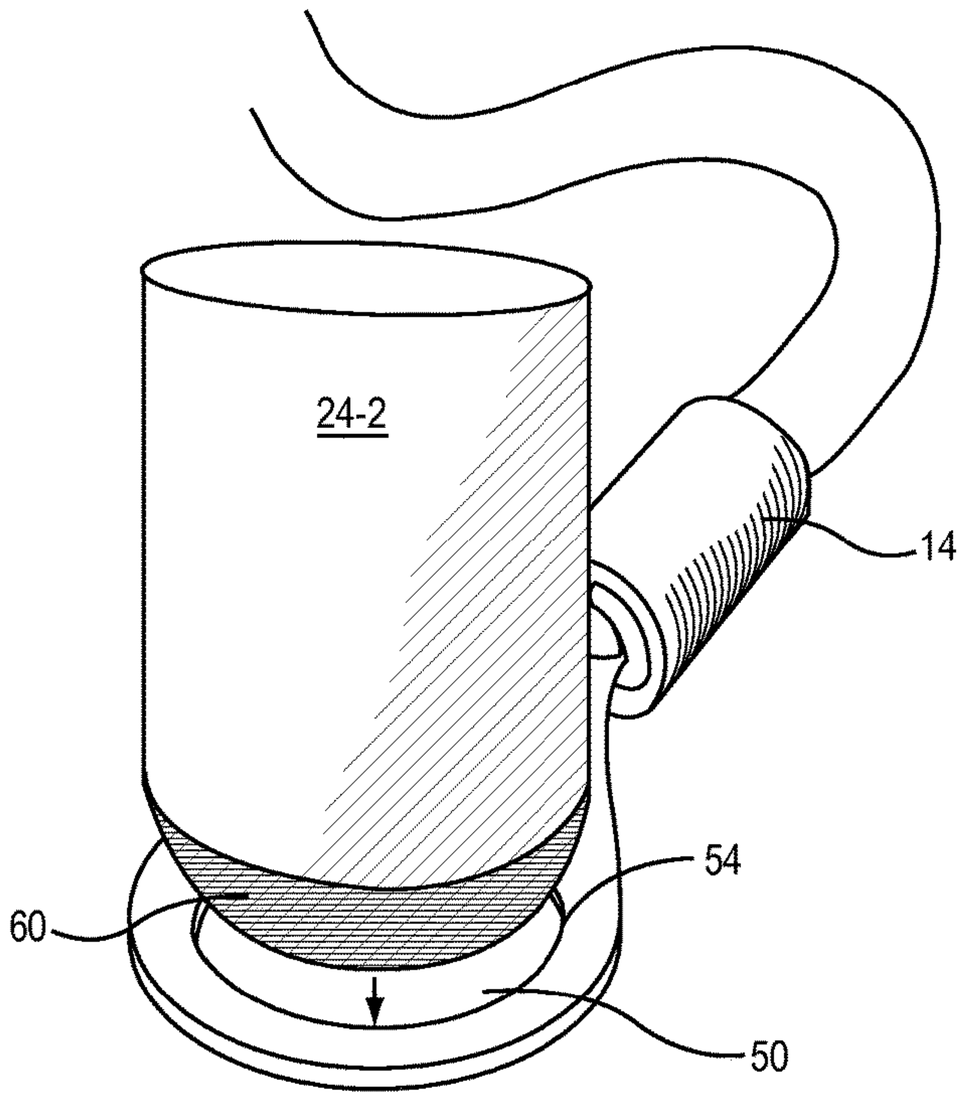


FIG. 5

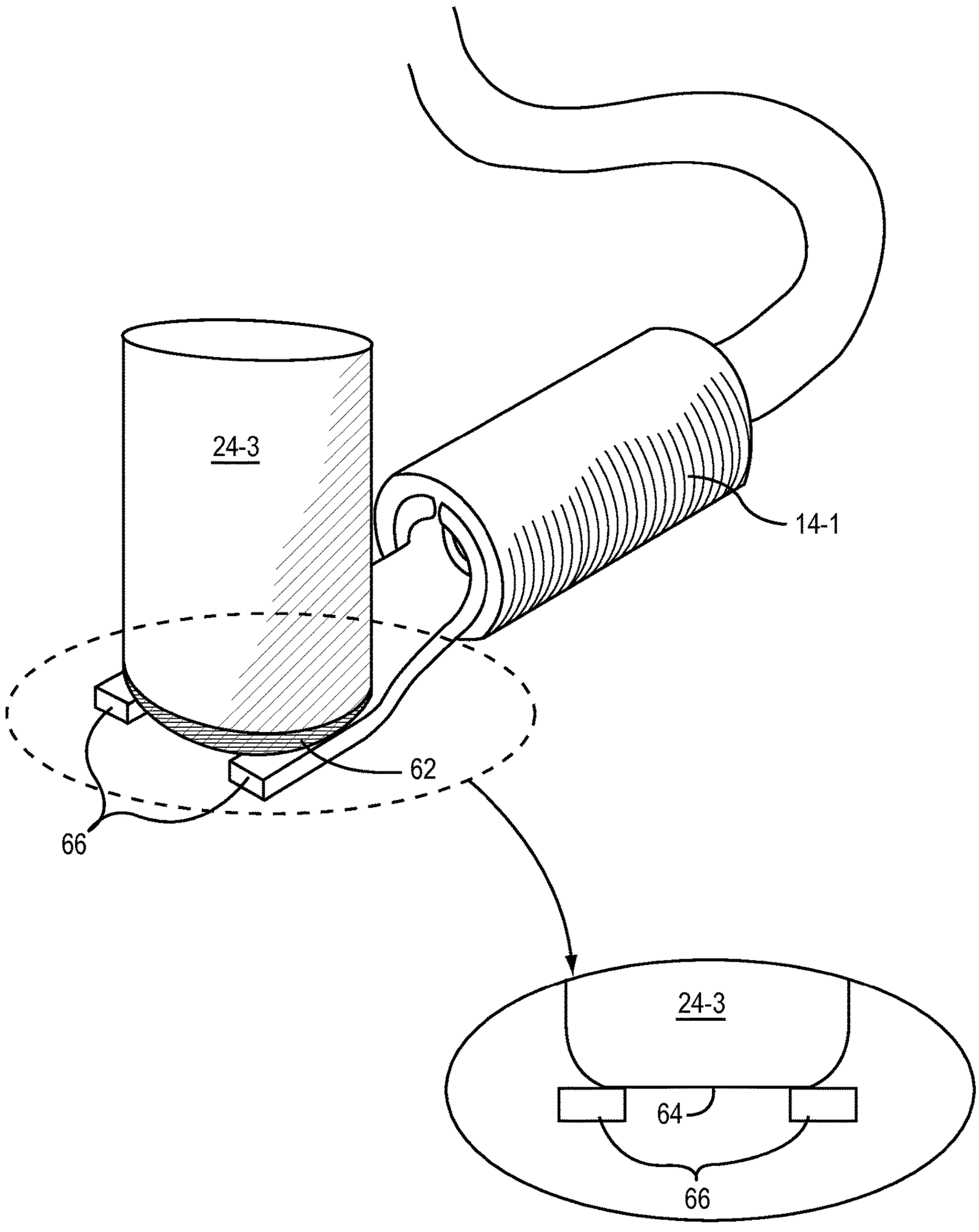


FIG. 6A

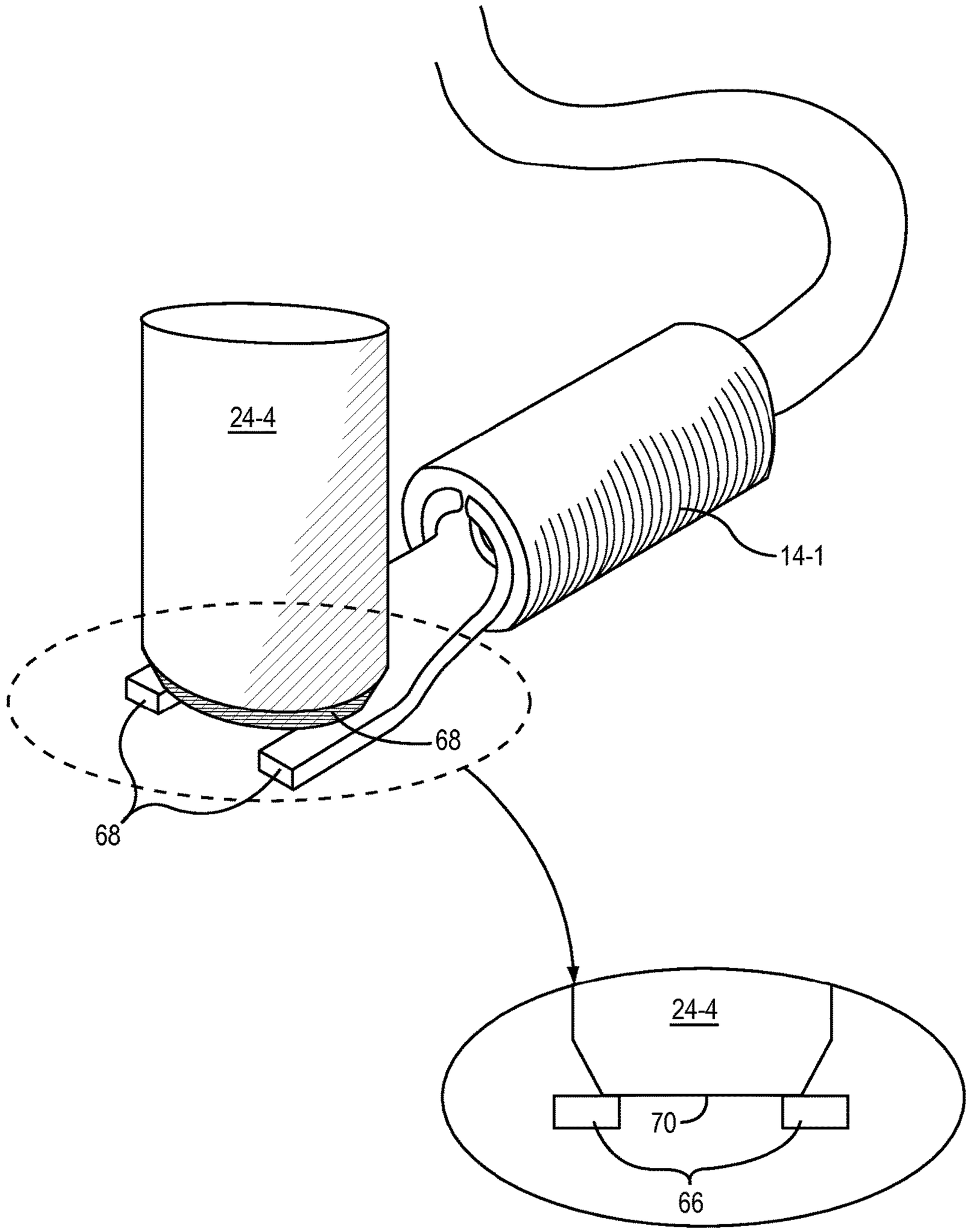


FIG. 6B

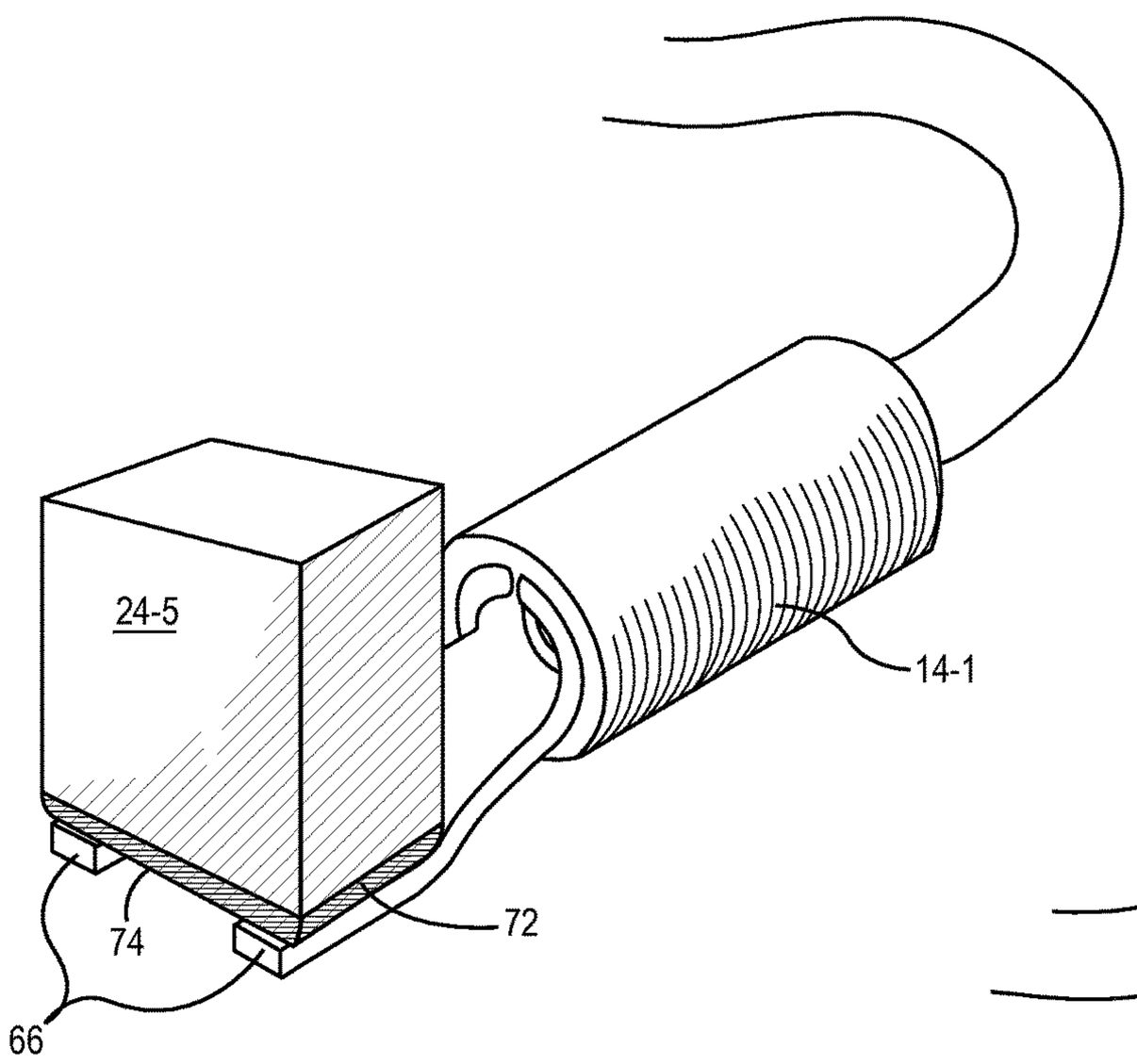


FIG. 6C

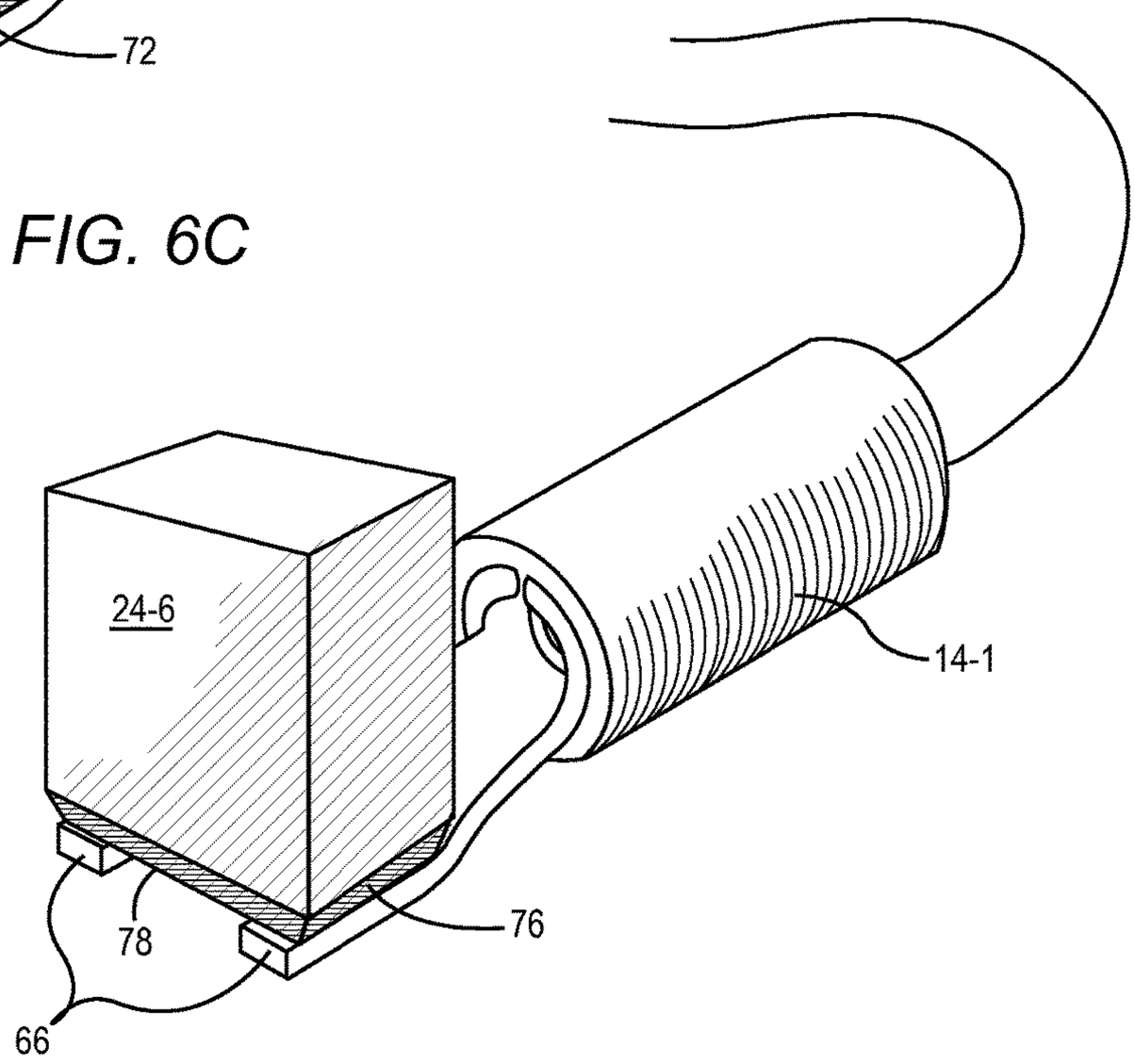


FIG. 6D

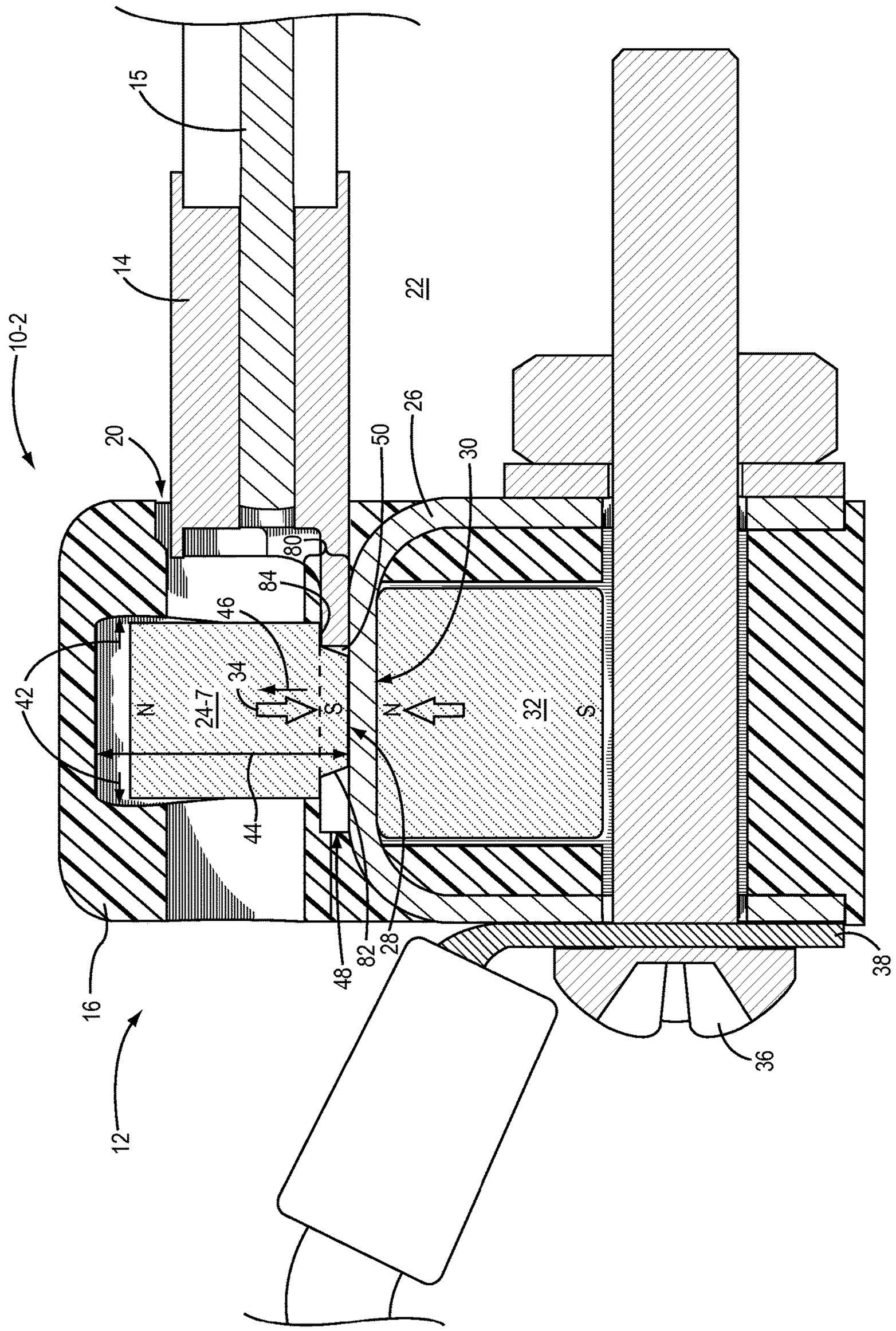


FIG. 7

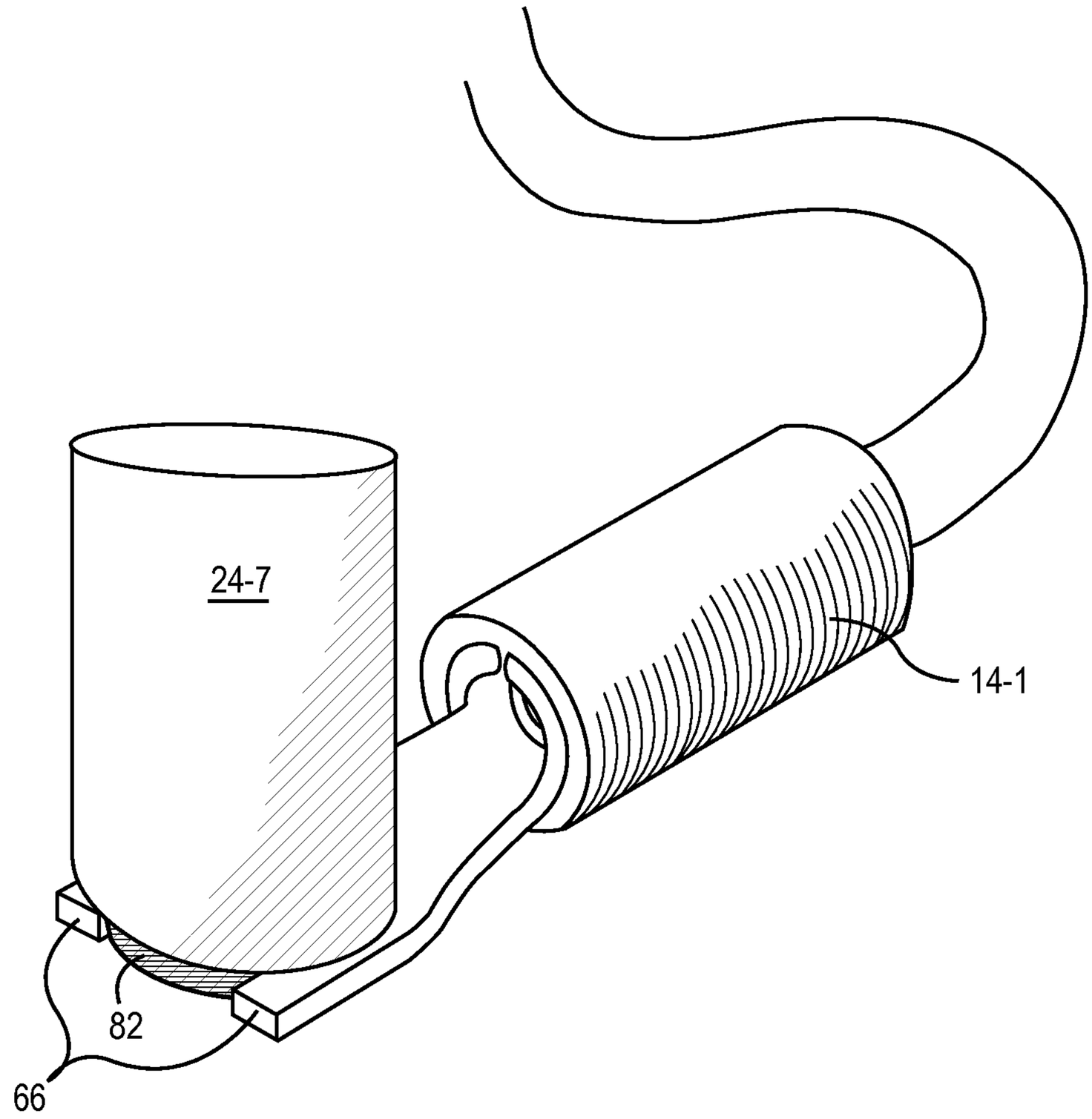


FIG. 8

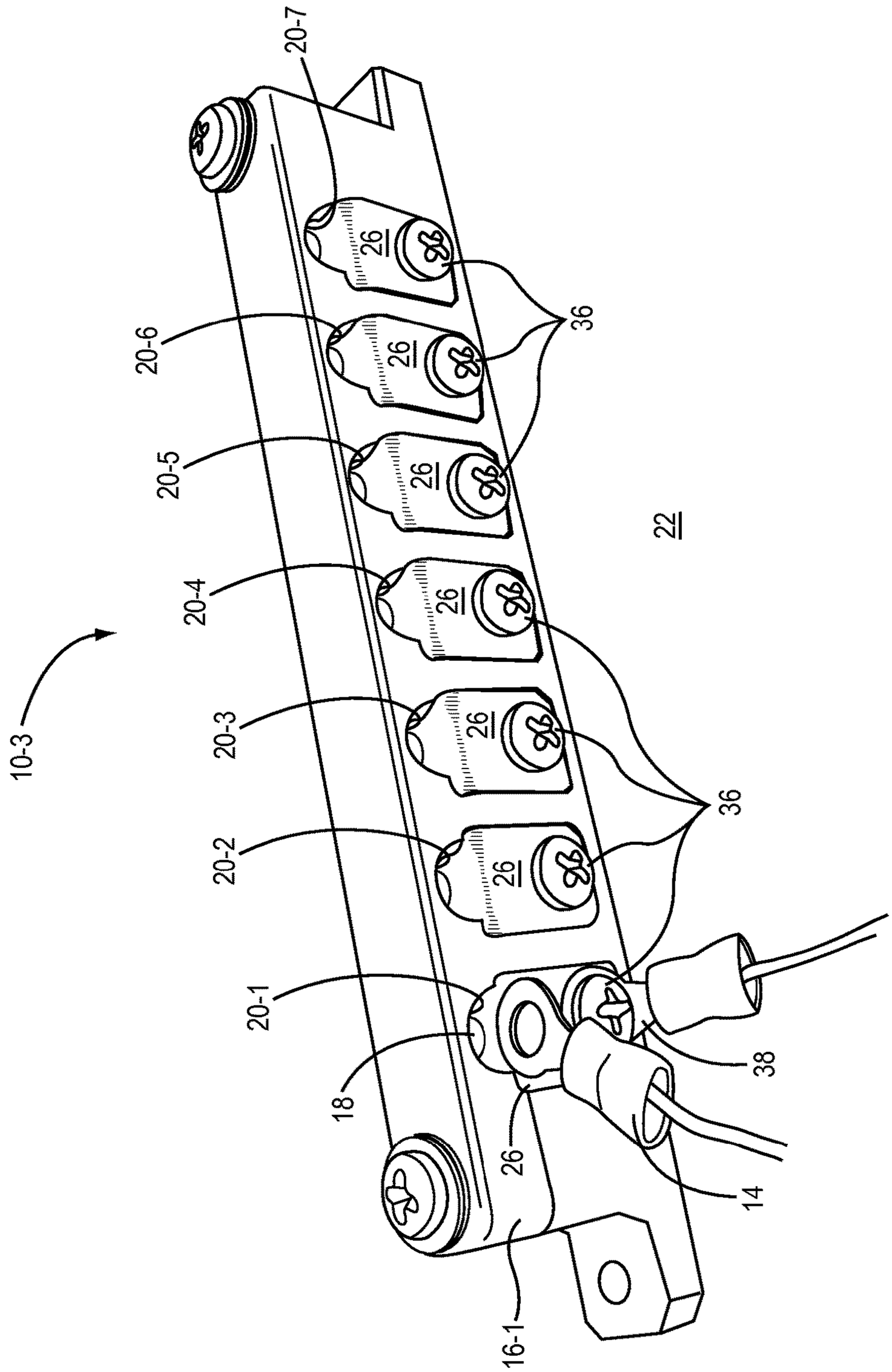
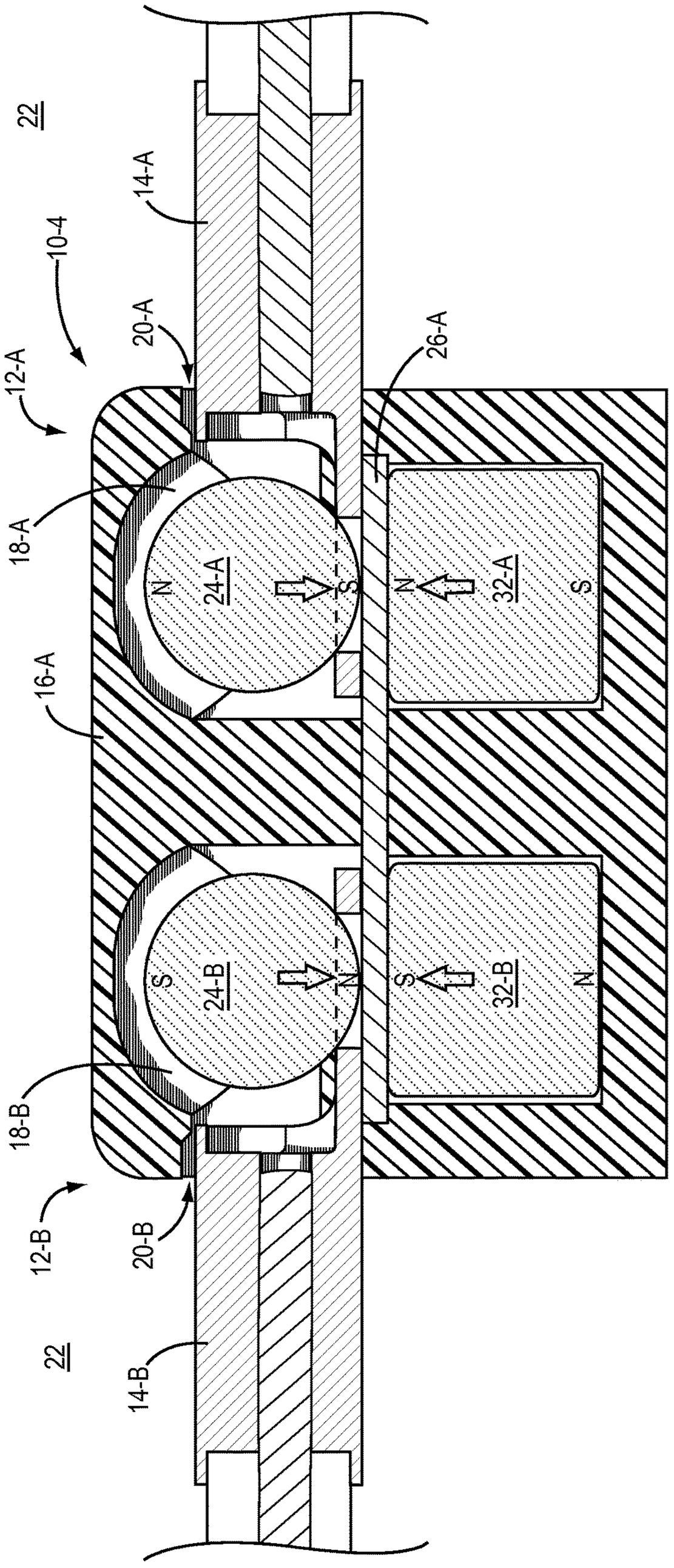


FIG. 9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S
32-A
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S
N
32-B
S
N
18-B
12-B
20-B
22
14-B

FIG. 10

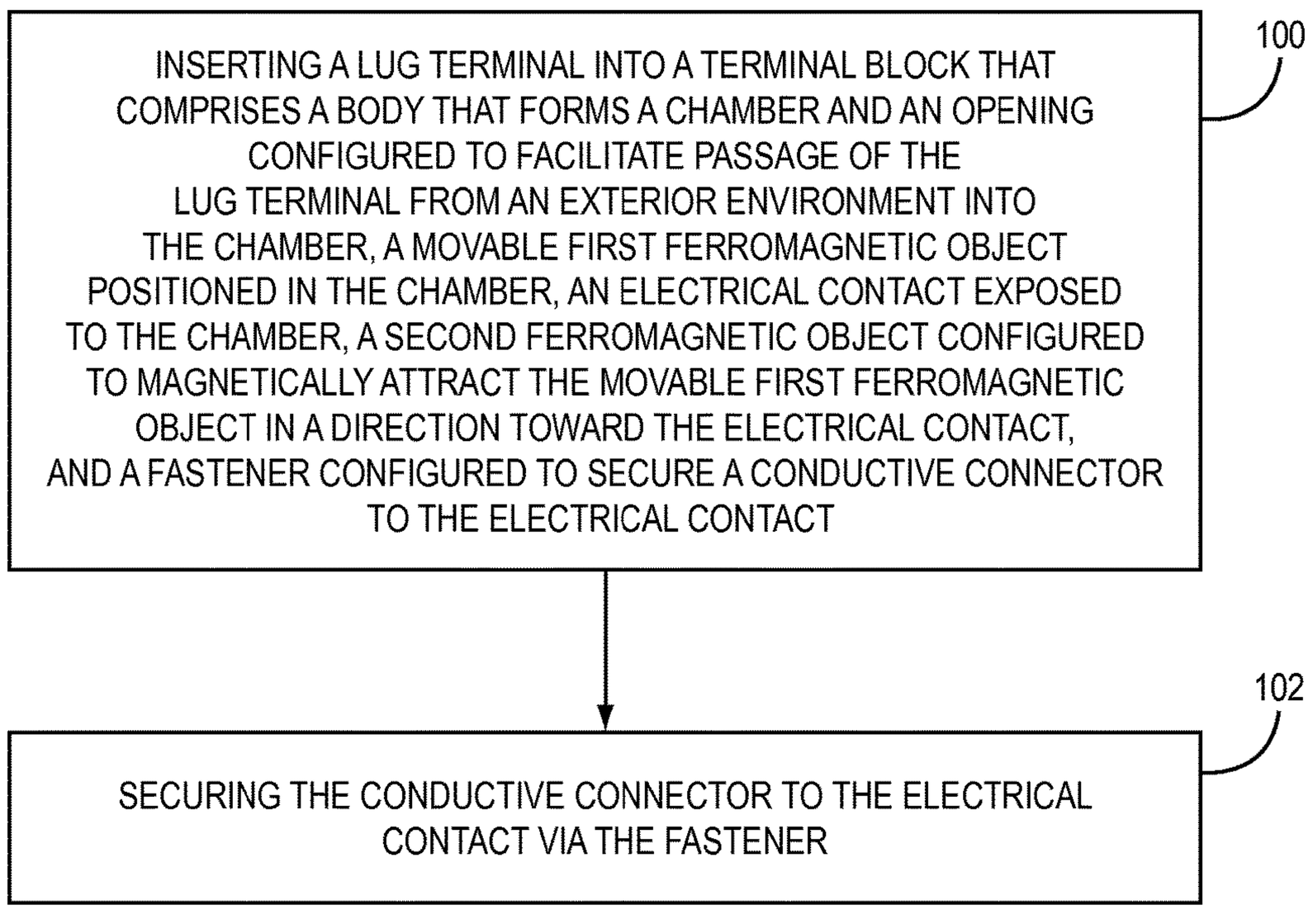
INSERTING A LUG TERMINAL INTO A TERMINAL BLOCK THAT COMPRISES A BODY THAT FORMS A CHAMBER AND AN OPENING CONFIGURED TO FACILITATE PASSAGE OF THE LUG TERMINAL FROM AN EXTERIOR ENVIRONMENT INTO THE CHAMBER, A MOVABLE FIRST FERROMAGNETIC OBJECT POSITIONED IN THE CHAMBER, AN ELECTRICAL CONTACT EXPOSED TO THE CHAMBER, A SECOND FERROMAGNETIC OBJECT CONFIGURED TO MAGNETICALLY ATTRACT THE MOVABLE FIRST FERROMAGNETIC OBJECT IN A DIRECTION TOWARD THE ELECTRICAL CONTACT, AND A FASTENER CONFIGURED TO SECURE A CONDUCTIVE CONNECTOR TO THE ELECTRICAL CONTACT
100
SECURING THE CONDUCTIVE CONNECTOR TO THE ELECTRICAL CONTACT VIA THE FASTENER
102

FIG. 11

LUG TERMINALS BLOCK FOR QUICK CONNECTION AND DISCONNECTION

RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application No. 61/988,488, filed on May 5, 2014, entitled RING TERMINAL QUICK CONNECT AND DISCONNECT, the disclosure of which is hereby incorporated herein by reference in its entirety.

GOVERNMENT RIGHTS

This invention was made with government funds under contract number W31P4Q-12-C-0001 awarded by PAC-3 MSE IPF. The U.S. Government may have rights in this invention.

TECHNICAL FIELD

The disclosure generally relates to electrical circuit connections, and particularly relates to a terminal block for quick connection and disconnection of one or more lug terminals.

BACKGROUND

A ring lug terminal is a type of electrical connector with a ring metal structure that is crimped at the end of a wire and can be used to electrically couple the wire to a conductive path using a screw and a nut. A spade lug terminal is similar to a ring lug terminal but uses a spade or bi-fork metal structure rather than a ring metal structure.

A terminal block is often used to electrically couple wires with lug terminals to various electrical paths. However, it can be tedious and time-consuming to connect lug terminals to a terminal block. Terminal blocks are often used in test environments to test an electronic device, where the connections need be secure during testing but are not permanent. Thus, the lug terminals are first connected to the terminal block, and the device is tested. The lug terminals are then disconnected from the terminal block. Devices under test may have hundreds of different wires that need to be connected to and then disconnected from the terminal block. Connecting and disconnecting hundreds of lug terminals with respect to a terminal block can take a relatively long period of time, and greatly extends the amount of time it takes to test a device, limiting the number of devices that can be tested in a given period of time.

Accordingly, there is a need for a terminal block that facilitates quick and intuitive connection and disconnection of lug terminals.

SUMMARY

The embodiments relate to a terminal block that utilizes magnets to facilitate relatively fast connection and disconnection of lug terminals to a terminal block.

In one embodiment, the terminal block includes a body that forms a chamber and an opening configured to facilitate passage of a lug terminal from an exterior environment into the chamber. A movable first ferromagnetic object is positioned in the chamber. An electrical contact is exposed to the chamber, and a second ferromagnetic object is configured to magnetically attract the movable first ferromagnetic object in a direction toward the electrical contact.

In one embodiment, the electrical contact comprises both a first surface that is exposed to the chamber, and a second surface. The second ferromagnetic object is fixed to the second surface.

In one embodiment, the movable first ferromagnetic object and the second ferromagnetic object comprise one of neodymium and samarium-cobalt.

In one embodiment, the movable first ferromagnetic object comprises steel, and the second ferromagnetic object comprises one of neodymium and samarium-cobalt.

In one embodiment, the moveable first ferromagnetic object is spheroidal, and has a diameter configured to fit within a ring of a ring lug terminal.

In one embodiment, the movable first ferromagnetic object is cylindrical, and has a bottom portion with an annular beveled edge that is configured to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

In one embodiment, the movable first ferromagnetic object is cylindrical, and has a bottom portion that has an annular curved edge configured to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

In one embodiment, the moveable first ferromagnetic object is rectangular, and has a bottom portion that is beveled to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

In one embodiment, the movable first ferromagnetic object is rectangular, and has a bottom portion that is curved to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

In one embodiment, the body comprises a side wall that defines a portion of the chamber. The side wall is configured to limit lateral displacement of the movable first ferromagnetic object. The chamber has a height sufficient to allow displacement of the movable first ferromagnetic object in a direction perpendicular to a first surface of the electrical contact to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

In one embodiment, the body forms a plurality of chambers and a plurality of corresponding openings. Each opening is configured to facilitate passage of a respective lug terminal of a plurality of lug terminals from the exterior environment into a corresponding chamber. The terminal block includes a plurality of movable first ferromagnetic objects, and each movable first ferromagnetic object of the plurality of movable first ferromagnetic objects is positioned in a corresponding chamber of the plurality of chambers. The terminal block further includes a plurality of electrical contacts, and each electrical contact of the plurality of electrical contacts is exposed to a corresponding chamber of the plurality of chambers. The terminal block further includes a plurality of second ferromagnetic objects, and each second ferromagnetic object of the plurality of second ferromagnetic objects is configured to magnetically attract one of the movable first ferromagnetic objects of the plurality of movable first ferromagnetic objects toward a corresponding electrical contact.

In one embodiment, the body forms a second chamber and a second opening that are configured to facilitate passage of a second lug terminal from the exterior environment into the second chamber. A movable third ferromagnetic object is positioned in the second chamber. A second electrical contact is exposed to the second chamber. The second electrical contact is conductively coupled to the first electrical contact. A fourth ferromagnetic object is configured to magnetically

attract the movable third ferromagnetic object in a direction toward the second electrical contact.

In another embodiment, a method for forming an electrical connection between a lug terminal and a conductive connector is provided. The method includes inserting the lug terminal into a terminal block, wherein the terminal block comprises a body that forms a chamber and an opening that are configured to facilitate passage of the lug terminal from an exterior environment into the chamber, a movable first ferromagnetic object positioned in the chamber, an electrical contact exposed to the chamber, a second ferromagnetic object configured to magnetically attract the movable first ferromagnetic object in a direction toward the electrical contact, and a fastener configured to secure the conductive connector to the electrical contact. The method further includes securing the conductive connector to the electrical contact via the fastener.

Those skilled in the art will appreciate the scope of the disclosure and realize additional aspects thereof after reading the following detailed description of the preferred embodiments in association with the accompanying drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawing figures incorporated in and forming a part of this specification illustrate several aspects of the disclosure, and together with the description serve to explain the principles of the disclosure.

FIG. **1** is a cross-sectional diagram of a terminal block according to one embodiment;

FIG. **2** is a perspective view illustrating a movable first ferromagnetic object and a lug terminal according to one embodiment;

FIG. **3** is a cross-sectional diagram of a terminal block according to another embodiment;

FIG. **4** is a perspective view illustrating a movable first ferromagnetic object and a lug terminal according to one embodiment;

FIG. **5** is a perspective view illustrating a movable first ferromagnetic object and the lug terminal according to another embodiment;

FIGS. **6**A-**6**D illustrate suitable shapes for movable first ferromagnetic objects for use with a spade lug terminal;

FIG. **7** is a cross-sectional diagram of a terminal block according to another embodiment;

FIG. **8** is a perspective view illustrating a movable first ferromagnetic object and a lug terminal according to another embodiment;

FIG. **9** is a perspective view of a terminal block according to another embodiment;

FIG. **10** is a cross-sectional diagram of a terminal block according to another embodiment; and

FIG. **11** is a flowchart of a method for forming an electrical connection between a lug terminal and a conductive connector according to one embodiment.

DETAILED DESCRIPTION

The embodiments set forth below represent the necessary information to enable those skilled in the art to practice the embodiments and illustrate the best mode of practicing the embodiments. Upon reading the following description in light of the accompanying drawing figures, those skilled in the art will understand the concepts of the disclosure and will recognize applications of these concepts not particularly addressed herein. It should be understood that these concepts and applications fall within the scope of the disclosure and the accompanying claims.

Any flowcharts discussed herein are necessarily discussed in some sequence for purposes of illustration, but unless otherwise explicitly indicated, the embodiments are not limited to any particular sequence of steps. The use herein of ordinals in conjunction with an element is solely for distinguishing what might otherwise be similar or identical labels, such as "first magnet" and "second magnet," and does not imply a priority, a type, an importance, or other attribute, unless otherwise stated herein. The phrase "ferromagnetic object" refers to an object that comprises a material that is magnetized, or is attracted to a magnetized material, such as, by way of non-limiting example, iron, nickel, cobalt, steel, a magnet, a super-magnet, a rare-earth magnet, and the like.

FIG. **1** is a cross-sectional diagram of a terminal block **10** according to one embodiment. The terminal block **10** includes a connection junction **12** that facilitates secure connection of a lug terminal **14** to the terminal block **10**. The lug terminal **14** is crimped or otherwise affixed to a conductive medium **15**, in this example a wire. The terminal block **10** includes a body **16** that forms a chamber **18** and an opening **20** that is configured to facilitate passage of the lug terminal **14** from an exterior environment **22** into the chamber **18**. The lug terminal **14** in this example comprises a ring lug terminal, but the embodiments are not limited to ring lug terminals, and have applicability to any type of lug terminal, including, by way of non-limiting example, spade lug terminals and the like.

The terminal block **10** includes a movable first ferromagnetic object **24** that is positioned in the chamber **18**. The movable first ferromagnetic object **24** comprises a magnet, or a material that is attracted to magnets. In one embodiment, the movable first ferromagnetic object **24** comprises a rare-earth material, such as neodymium or samarium-cobalt. In another embodiment, the movable first ferromagnetic object **24** comprises a steel ball. The terminal block **10** also includes an electrical contact **26** that is exposed to the chamber **18**. The electrical contact **26** has a first surface **28** that is exposed to the chamber **18** and a second surface **30**. A second ferromagnetic object **32** is positioned with respect to the second surface **30** and is configured to magnetically attract the movable first ferromagnetic object **24** in a direction **34** toward the first surface **28** of the electrical contact **26**. The second ferromagnetic object **32** may comprise a magnet, or a material that is attracted to magnets. If the movable first ferromagnetic object **24** is not a magnet, then the second ferromagnetic object **32** comprises a magnet. In some embodiments, both the movable first ferromagnetic object **24** and the second ferromagnetic object **32** comprise magnets, such as, by way of non-limiting example, neodymium or samarium-cobalt magnets. Where both the movable first ferromagnetic object **24** and the second ferromagnetic object **32** comprise magnets, it is desirable that the magnetic directions, illustrated throughout the drawings as "N" and "S", are oriented such that the movable first ferromagnetic object **24** and the second ferromagnetic object **32** attract one another. In some embodiments, the second ferromagnetic object **32** is fixed with respect to the second surface **30**, such as via an epoxy or other adhesive or fastening mechanism.

The attraction between the movable first ferromagnetic object **24** and the second ferromagnetic object **32** secures the lug terminal **14** with respect to the electrical contact **26**. The lug terminal **14** is secured sufficiently to form a conductive path with the electrical contact **26** and to inhibit accidental removal of the lug terminal **14** from the connection junction

12, but can relatively easily be inserted into the opening **20** and relatively easily extracted from the opening **20** as appropriate.

The terminal block **10** includes a fastener **36**, in this embodiment a screw, that is configured to secure a conductive connector **38**, in this example another ring lug terminal, to the electrical contact **26**. In the embodiment illustrated in FIG. **1**, an electrical path exists between the conductive connector **38**, the electrical contact **26**, and the lug terminal **14**.

While for purposes of illustration the terminal block **10** comprises a single connection junction **12**, in other embodiments, the terminal block **10** may comprise any number of connection junctions **12** and, in some embodiments, may comprise hundreds or thousands of connection junctions **12**, to facilitate the quick connection of hundreds or thousands of wires to other conductive paths.

The chamber **18** is defined at least in part by a side wall **40** that is configured to limit lateral displacement of the movable first ferromagnetic object **24** in directions **42**. The chamber **18** has a height **44** sufficient to allow displacement of the movable first ferromagnetic object **24** in a direction **46** perpendicular to the first surface **28** of the electrical contact **26** to facilitate insertion of the lug terminal **14** between the movable first ferromagnetic object **24** and the first surface **28** of the electrical contact **26**. When the lug terminal **14** is inserted into the opening **20**, an edge **48** of the lug terminal **14** contacts the surface of the movable first ferromagnetic object **24**, which, in this example, is spheroidal. The edge **48** urges the movable first ferromagnetic object **24** away from the first surface **28**, and the side wall **40** limits lateral movement of the movable first ferromagnetic object **24** so that the movable first ferromagnetic object **24** is contained within the chamber **18**. As the lug terminal **14** is inserted a sufficient distance into the chamber **18**, the magnetic attraction between the movable first ferromagnetic object **24** and the second ferromagnetic object **32** causes the movable first ferromagnetic object **24** to drop into an opening **50** of the lug terminal **14**, securing the lug terminal **14** with respect to the electrical contact **26**.

FIG. **2** is a perspective view illustrating the movable first ferromagnetic object **24** and the lug terminal **14** according to one embodiment. The movable first ferromagnetic object **24** is spheroidal, and has a diameter **52** such that the movable first ferromagnetic object **24** fits within the opening **50** and contacts an annular edge **54** of the lug terminal **14** that forms the opening **50**. This enables the movable first ferromagnetic object **24** to securely fix the lug terminal **14** to the electrical contact **26** (FIG. **1**).

FIG. **3** is a cross-sectional diagram of a terminal block **10-1** according to another embodiment. The terminal block **10-1** is substantially similar to the terminal block **10** except as otherwise discussed herein. In this embodiment, a movable first ferromagnetic object **24-1** is cylindrical and has a bottom portion **56** that has an annular beveled edge **58** configured to facilitate insertion of the lug terminal **14** between the movable first ferromagnetic object **24-1** and the electrical contact **26**.

A chamber **18-1** is defined at least in part by a side wall **40-1** that is configured to limit lateral displacement of the movable first ferromagnetic object **24-1** in directions **42**. The chamber **18-1** has a height **44-1** that is sufficient to allow displacement of the movable first ferromagnetic object **24-1** in the direction **46** perpendicular to the first surface **28** of the electrical contact **26** to facilitate insertion of the lug terminal **14** between the movable first ferromagnetic object **24-1** and the electrical contact **26**. When the lug terminal **14** is inserted into the opening **20**, an edge **48** of the lug terminal **14** contacts the annular beveled edge **58** of the movable first ferromagnetic object **24-1**. The edge **48** urges the movable first ferromagnetic object **24-1** away from the first surface **28** and the side wall **40-1** limits lateral movement of the movable first ferromagnetic object **24-1** so that the movable first ferromagnetic object **24-1** is contained within the chamber **18-1**. As the lug terminal **14** is inserted a sufficient distance into the chamber **18-1**, the magnetic attraction between the movable first ferromagnetic object **24-1** and the second ferromagnetic object **32** causes the movable first ferromagnetic object **24-1** to drop into the opening **50** of the lug terminal **14**, securing the lug terminal **14** with respect to the electrical contact **26**.

FIG. **4** is a perspective view illustrating the movable first ferromagnetic object **24-1** and a lug terminal **14** according to one embodiment. The movable first ferromagnetic object **24-1** is cylindrical, and has a diameter such that the annular beveled edge **58** fits within the opening **50** and contacts an annular edge **54** of the lug terminal **14** that forms the opening **50**. This enables the movable first ferromagnetic object **24-1** to securely fix the lug terminal **14** to the electrical contact **26** (FIG. **3**).

FIG. **5** is a perspective view illustrating a movable first ferromagnetic object **24-2** and the lug terminal **14** according to another embodiment. In this embodiment, the movable first ferromagnetic object **24-2** is cylindrical, and has an annular curved edge **60** that fits within the opening **50** and contacts an annular edge **54** of the lug terminal **14** that forms the opening **50**. This enables the movable first ferromagnetic object **24-2** to securely fix the lug terminal **14** to the electrical contact **26** (FIG. **3**).

FIGS. **6**A-**6**D illustrate suitable shapes for movable first ferromagnetic objects for use with a spade lug terminal **14-1**. FIG. **6**A illustrates a cylindrical movable first ferromagnetic object **24-3** having an annular curved edge **62** and a bottom surface **64** that allows insertion of the spade lug terminal **14-1** into a suitably shaped chamber. The bottom surface **64** contacts prongs **66** of the spade lug terminal **14-1** and fixes the spade lug terminal **14-1** with respect to the electrical contact **26** (FIGS. **1**, **3**).

FIG. **6**B illustrates a cylindrical movable first ferromagnetic object **24-4** having an annular beveled edge **68** and a bottom surface **70** that allows insertion of the spade lug terminal **14-1** into a suitably shaped chamber. The bottom surface **70** contacts the prongs **66** of the spade lug terminal **14-1** and fixes the spade lug terminal **14-1** with respect to the electrical contact **26** (FIGS. **1**, **3**).

FIG. **6**C illustrates a rectangular movable first ferromagnetic object **24-5** having a curved edge **72** and a bottom surface **74** that allows insertion of the spade lug terminal **14-1** into a suitably shaped chamber. The bottom surface **74** contacts the prongs **66** of the spade lug terminal **14-1** and fixes the spade lug terminal **14-1** with respect to the electrical contact **26** (FIGS. **1**, **3**).

FIG. **6**D illustrates a rectangular movable first ferromagnetic object **24-6** having a beveled edge **76** and a bottom surface **78** that allows insertion of the spade lug terminal **14-1** into a suitably shaped chamber. The bottom surface **78** contacts the prongs **66** of the spade lug terminal **14-1** and fixes the spade lug terminal **14-1** with respect to the electrical contact **26** (FIGS. **1**, **3**).

FIG. **7** is a cross-sectional diagram of a terminal block **10-2** according to one embodiment. The terminal block **10-2** is substantially similar to the terminal blocks **10**, **10-1** except as otherwise discussed herein. In this embodiment, a movable first ferromagnetic object **24-7** is cylindrical and has a

bottom portion **80** that includes a beveled edge **82** and a planar surface **84** that is suited for operation with either a ring lug terminal or a spade lug terminal.

FIG. **8** is a perspective view illustrating the movable first ferromagnetic object **24-7** and the lug terminal **14-1** according to one embodiment.

FIG. **9** is a perspective view of a terminal block **10-3** according to another embodiment. In this example, a body **16-1** forms a plurality of chambers **18** (only partially illustrated) and a plurality of corresponding openings **20-1-20-7** (generally openings **20**), each opening **20** configured to facilitate passage of a respective lug terminal **14** (only one illustrated) of a plurality of lug terminals **14** from the exterior environment **22** into a corresponding chamber **18**. The terminal block **10-3** includes a plurality of movable first ferromagnetic objects **24** (FIG. **1**). Each movable first ferromagnetic object **24** is positioned in a corresponding chamber **18**. Each electrical contact **26** is exposed to a corresponding chamber **18**. The terminal block **10-3** also includes a plurality of second ferromagnetic objects **32** (FIG. **1**). Each second ferromagnetic object **32** is configured to magnetically attract one of the movable first ferromagnetic objects **24** toward a corresponding electrical contact **26**. In some embodiments, the magnetic directions of the movable first ferromagnetic objects **24** and the second ferromagnetic objects **32** may be staggered.

The terminal block **10-3** also includes a plurality of fasteners **36** configured to secure a conductive connector **38** of a plurality of conductive connectors **38** to one electrical contact **26** of the plurality of electrical contacts **26**.

FIG. **10** is a cross-sectional diagram of a terminal block **10-4** according to another embodiment. This embodiment is substantially similar to the terminal block **10** illustrated in FIG. **1**, except the terminal block **10-4** contains two connection junctions **12**-A and **12**-B to allow two lug terminals **14**-A, **14**-B to be quickly electrically coupled together. In particular, a body **16**-A forms a first chamber **18**-A, a second chamber **18**-B, a first opening **20**-A, and a second opening **20**-B. The first opening **20**-A facilitates passage of a lug terminal **14**-A from the exterior environment **22** into the first chamber **18**-A, and the second opening **20**-B facilitates passage of a lug terminal **14**-B from the exterior environment **22** into the second chamber **18**-B. A movable first ferromagnetic object **24**-A is positioned in the first chamber **18**-A, and a movable second ferromagnetic object **24**-B is positioned in the second chamber **18**-B. In this embodiment, an electrical contact **26**-A spans, and is exposed to, the two chambers **18**-A, **18**-B. A third ferromagnetic object **32**-A is configured to magnetically attract the movable first ferromagnetic object **24**-A in a direction toward the electrical contact **26**-A, and a fourth ferromagnetic object **32**-B is configured to magnetically attract the movable second ferromagnetic object **24**-B in a direction toward the electrical contact **26**-A. In one embodiment, a sufficiently long single ferromagnetic object may be utilized in place of the third and fourth ferromagnetic objects **32**-A and **32**-B.

FIG. **11** is a flowchart of a method for forming an electrical connection between a lug terminal and a conductive connector according to one embodiment. FIG. **11** will be discussed in conjunction with FIG. **1**. The lug terminal **14** is inserted into the terminal block **10**, which comprises the body **16** that forms the chamber **18** and the opening **20** that is configured to facilitate passage of the lug terminal **14** from the exterior environment **22** into the chamber **18**. The terminal block **10** also includes the movable first ferromagnetic object **24** positioned in the chamber **18**, the electrical contact **26** exposed to the chamber **18**, the second ferromagnetic object **32** that is configured to magnetically attract the movable first ferromagnetic object **24** in the direction **34** toward the electrical contact **26**, and the fastener **36** that is configured to secure the conductive connector **38** to the electrical contact **26** (block **100**). The conductive connector **38** is secured to the electrical contact **26** via the fastener **36** (block **102**).

Those skilled in the art will recognize improvements and modifications to the preferred embodiments of the disclosure. All such improvements and modifications are considered within the scope of the concepts disclosed herein and the claims that follow.

What is claimed is:

1. A terminal block comprising:

a body that forms a chamber and an opening configured to facilitate passage of a lug terminal from an exterior environment into the chamber;

a movable first ferromagnetic object positioned in the chamber;

an electrical contact exposed to the chamber; and

a second ferromagnetic object configured to magnetically attract the movable first ferromagnetic object in a direction toward the electrical contact to urge the lug terminal against the electrical contact.

2. The terminal block of claim **1**, wherein the electrical contact comprises a first surface that is exposed to the chamber, and a second surface, and wherein the second ferromagnetic object is fixed to the second surface.

3. The terminal block of claim **1**, wherein the movable first ferromagnetic object and the second ferromagnetic object comprise a rare-earth material.

4. The terminal block of claim **3**, wherein the rare-earth material comprises one of neodymium and samarium-cobalt.

5. The terminal block of claim **1**, wherein the movable first ferromagnetic object comprises steel, and the second ferromagnetic object comprises one of neodymium and samarium-cobalt.

6. The terminal block of claim **1**, wherein the movable first ferromagnetic object is spheroidal, and has a diameter configured to fit within a ring of a ring lug terminal.

7. The terminal block of claim **1**, wherein the movable first ferromagnetic object is cylindrical, the movable first ferromagnetic object having a bottom portion that has an annular beveled edge configured to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

8. The terminal block of claim **1**, wherein the movable first ferromagnetic object is cylindrical, the movable first ferromagnetic object having a bottom portion that has an annular curved edge configured to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

9. The terminal block of claim **1**, wherein the movable first ferromagnetic object is rectangular, the movable first ferromagnetic object having a bottom portion that is beveled to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

10. The terminal block of claim **1**, wherein the movable first ferromagnetic object is rectangular, the movable first ferromagnetic object having a bottom portion that is curved to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

11. The terminal block of claim **1**, wherein the body comprises a side wall that defines a portion of the chamber, the side wall configured to limit lateral displacement of the movable first ferromagnetic object, the chamber having a height sufficient to allow displacement of the movable first

ferromagnetic object in a direction perpendicular to a first surface of the electrical contact to facilitate insertion of the lug terminal between the movable first ferromagnetic object and the electrical contact.

12. The terminal block of claim **1**, further comprising:

a fastener configured to secure a conductive connector to the electrical contact.

13. The terminal block of claim **1**, wherein the body forms a plurality of chambers and a plurality of corresponding openings, each opening configured to facilitate passage of a respective lug terminal of a plurality of lug terminals from the exterior environment into a corresponding chamber, the terminal block further comprising:

a plurality of movable first ferromagnetic objects, each movable first ferromagnetic object of the plurality of movable first ferromagnetic objects positioned in a corresponding chamber of the plurality of chambers;

a plurality of electrical contacts, each electrical contact of the plurality of electrical contacts exposed to a corresponding chamber of the plurality of chambers;

a plurality of second ferromagnetic objects, each second ferromagnetic object of the plurality of second ferromagnetic objects configured to magnetically attract one of the movable first ferromagnetic objects of the plurality of movable first ferromagnetic objects toward a corresponding electrical contact.

14. The terminal block of claim **12**, further comprising a plurality of fasteners, each fastener configured to secure a conductive connector of a plurality of conductive connectors to one electrical contact of the plurality of electrical contacts.

15. The terminal block of claim **1**, wherein the body forms a second chamber and a second opening configured to facilitate passage of a second lug terminal from the exterior environment into the second chamber;

a movable third ferromagnetic object positioned in the second chamber;

a second electrical contact exposed to the second chamber, the second electrical contact conductively coupled to the first electrical contact;

a fourth ferromagnetic object configured to magnetically attract the movable third ferromagnetic object in a direction toward the second electrical contact.

16. A method for forming an electrical connection between a lug terminal and a conductive connector comprising:

inserting the lug terminal into a terminal block, the terminal block comprising:

a body that forms a chamber and an opening configured to facilitate passage of the lug terminal from an exterior environment into the chamber;

a movable first ferromagnetic object positioned in the chamber;

an electrical contact exposed to the chamber;

a second ferromagnetic object configured to magnetically attract the movable first ferromagnetic object in a direction toward the electrical contact to urge the lug terminal against the electrical contact; and

a fastener configured to secure the conductive connector to the electrical contact; and

securing the conductive connector to the electrical contact via the fastener.

17. A terminal block comprising:

a body that forms a chamber and an opening configured to facilitate passage of a lug terminal from an exterior environment into the chamber;

a movable first ferromagnetic object and a second ferromagnetic object;

an electrical contact fixed to the body and exposed to the chamber and positioned between the movable first ferromagnetic object and the second ferromagnetic object; and

wherein:

the movable first ferromagnetic object is positioned in the chamber and is configured to move in a first direction away from the electrical contact upon passage of the lug terminal into the chamber; and

the second ferromagnetic object is configured to magnetically attract the movable first ferromagnetic object in a second direction toward the electrical contact to urge the lug terminal against the electrical contact.

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